

**IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE**

Applicant: **Thomas S. Laubner et al.**

Application No: **09/966,221**

Filing Date: **September 28, 2001**

Title: **MICROSTRIP ANTENNA WITH
IMPROVED LOW ANGLE
PERFORMANCE**

Group Art Unit: **2821**

Examiner: **Wimer, M. C.**

Confirmation No. **5888**

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Commissioner for Patents
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Attention: Board of Patent Appeals and Interferences

REPLY TO EXAMINER'S ANSWER

In the Examiner's Answer dated January 11, 2008, the Examiner has thoughtfully responded to most, if not all, of Applicant's many individual and specific points and arguments set forth in the Appeal Brief. Nevertheless, it is believed that the primary overarching issue is whether it is obvious that combining the raised ground plane of Murphy with the dielectric lens of Openlander would lead to the desired result of increasing radiation at angles less than 45° from the ground plane without substantially diminishing radiation closer to the zenith.

The relevant facts that inform the answer to this question are relatively simple. Specifically, the present invention combines a dielectric lens with a slightly raised ground plane to achieve the synergistic result of increasing

radiation below 45° without substantially diminishing radiation closer to zenith. The dielectric lens directs radiation closer to the horizon as admittedly taught by Openlander. In addition, placing the patch on a small ground plane raised above the larger ground plane leads to several synergistic results in connection with the lens. First, it permits more downward refraction of waves. Specification, page 6, lines 2-5. Secondly, it provides capacitive coupling between the patch and the lower ground plane. Specification, page 6, lines 5-6. Finally, it also creates open volume immediately surrounding the radiating patch that makes it easier to create and position the dielectric lens in the most desirable orientation and position around the radiating patch.

Applicant argued that the prior art of record does not teach the proposed combination of these two features for the synergistic reasons set forth in the specification of the present application. The Examiner essentially has not challenged that conclusion. Accordingly, the question is whether there is some other motivation to make the proposed combination. The Examiner asserted that there is such a motivation and that such motivation is simply that it is obvious that the two features can complement each other to lower the angle of radiation further than either could alone.

Thus, the Examiner's position is built on the assumption that, if one wanted to lower the angle of radiation more than could be achieved using either feature alone, it would have been obvious that combining the two features would have an additive effect of lowering the radiation angle further than either taken alone.

This conclusion is not adequately supported by the evidence of record.

The Examiner has essentially conceded that the prior art of record does not suggest the proposed combination for the synergistic results that Applicant's specification sets forth. Rather, the proposed motivation to make the combination of the two features is simply to get the additive effect of using two different angle-lowering features together. However, the assumption that these two features would work together to further lower the angle of radiation, if so desired, is not a valid assumption.

Specifically, as previously noted and essentially acceded to by the Examiner, Murphy teaches the raised ground plane for a completely different purpose than in the present invention. Specifically, Murphy discloses that raising the second ground plane and patch above the larger ground plane by $\frac{1}{4}$ wavelength to $\frac{1}{2}$ wavelength lowers the angle of radiation or reception directly out of or into the patch. It is difficult to know the result of combining the low angle radiation directly out of the patch of Murphy with Openlander's lens that refracts that radiation. Since the radiator of Murphy will directly be producing significant radiation at low angles and poor radiation at high angles, it is difficult to know how Openlander's lens would change Murphy's radiation pattern. However, it most likely will either make it too narrow (and thus not leave substantial radiation at zenith, as claimed) or possibly even reverse Murphy's low angle pattern. Thus, at best, the result of the proposed combination is unknown (in which case, there would be no "reasonable expectation of success"). At worst, the proposed combination has the opposite effect to that desired by both references. Thus, it cannot be reasonably said that there is a suggestion in the prior art to combine the references.

The issue discussed in the preceding paragraph is fundamentally different from the typical situation where the teachings of two references are being combined in an obviousness rejection. Specifically, in most such situations, it is obvious whether or not the combination would result in the desired result because either (1) the technology is sufficiently well understood that it is obvious that the combination would have a certain result or (2) the references themselves suggest the proposed result. That is not the situation here. First, as noted above, it is not at all obvious that this combination would have the desired result as it might reverse the effect of the lens rather than enhance it. Clearly, it is the Examiner's responsibility to establish such in order to present a prima facie case of obviousness. He has not done so.

Second, the references themselves do not suggest the combination. Openlander clearly devises to refract downwardly radiation from the patch that is close to the zenith, rather than the unique low angle radiation pattern of Murphy.

Murphy, which radiates directly out of the patch at a low angle, contains nothing to suggest adding a lens.

Thus, there is no teaching, suggestion, or motivation to make such a combination.

This leaves for consideration the issue of whether the present situation falls within any other basis for finding the claimed invention to be obvious in view of KSR International, Inc. v. Teleflex Inc., 550 U.S., 85 USPQ 2d 1385 (2007).. The only other potential basis for such a finding is the narrow revival by the Supreme Court of "obvious to try". Specifically, it had long been established that an obviousness rejection based on the conclusion that it would have been obvious to try a certain combination to see if it would solve a problem is not a proper basis for an obviousness rejection. The Supreme Court recently revived the obvious to try basis for rejecting a claim as obvious in situations where there were a limited number of identified, predictable solutions, with a reasonable expectation of success.

The present situation does not present the proper facts to qualify under the new "obvious to try" basis. Particularly, the cases in which this rational is applicable are cases in which a given apparatus or method has a known shortcoming and there are a small number of known solutions to that shortcoming. They are frequently pharmaceutical or DNA cases wherein there are a relatively small, known number of compounds having certain desirable properties and the invention involves the selection of one of those known compounds. For example, in the case of Pfizer, Inc. v. Apotex, 480 F.3d 1348, 82 USPQ2d 1321 (Fed. Cir. 2007), the claimed invention was directed to the amlodipine besylate drug product that was commercially sold as Norvasc®. At the time of the invention, amlodipine was known as well as the use of besylate anions. Amlodipine was known to have the same properties as were being claimed for the amlodipine besylate, but Pfizer discovered that the besylate form had better manufacturing properties (less stickiness). Pfizer argued that the results of forming amlodipine besylate would have been unpredictable, and, therefore, unobvious. The Federal Circuit rejected the notion that unpredictability

equated with nonobviousness because there were only 53 pharmaceutically acceptable salts to be tested for improved properties. The court found that one of ordinary skill having problems with the machinability of amlodipine would have looked to forming a salt of the compound and would have been able to narrow the group to the 53 anions known to form pharmaceutically acceptable salts.

The present situation is completely different. Looking at the present situation in the best light possible for supporting an "obvious to try" rejection, we would have two known solutions for increasing radiation close to the horizon, namely, (1) raising the patch above the ground plane on a second ground plane and (2) using a dielectric lens. Thus, using either one of these solutions in combination with art disclosing a conventional microstrip antenna might be obvious to try. However, combining the two different solutions to the same problem certainly does not fall within the "obvious to try" rationale.

The present rejection is, at best, a classic "obvious to try" rejection that has long been deemed improper.

Also, Applicant must reemphasize that the references teach away from the proposed combination, which is a strong indicator of non-obviousness. Applicant has previously argued that the references teach away from the combination because the goal of Openlander is to increase low angle gain without increasing the height (profile) of the antenna (col. 5, line 55 - col. 6, line 5), whereas the proposed combination with Murphy would result in an extremely high profile antenna because of, not just slightly raising the patch, but of raising the patch $\frac{1}{4}$ to $\frac{1}{2}$ wavelength above the ground plane.

The Examiner dismissed this argument by asserting that low profile is not defined in the claims and that a $\frac{1}{4}$ wavelength height antenna could be deemed low profile compared to a $\frac{1}{2}$ wavelength height antenna. These arguments ignore the practical impact of the teachings of the two prior art references on the person of ordinary skill in the related art. As discussed in Applicant's Appeal Brief, Openlander very prominently discusses that a goal is to provide a low profile antenna. Col. 5, line 55 – col. 6, line 5. Also as discussed in Applicant's Appeal Brief, Murphy teaches that, as a practical matter, spacing between the

two ground planes needs to be between $\frac{1}{4}$ and $\frac{1}{2}$ wavelength to achieve reasonable results. Col. 4, ll. 9-31.

While it is true neither Openlander nor Murphy states what it considers to be low profile, one must take to heart the admonishment of the Supreme Court in the KSR International, Inc. v. Teleflex Inc. case that the person of ordinary skill in the art has creativity and understanding, is not an automaton, and brings to the table a knowledge-base. KSR International, Inc. v. Teleflex Inc. ("As our precedents make clear, however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account the inferences and creative steps that a person of ordinary skill in the art would employ" and "A person of ordinary skill is also a person of ordinary creativity, not an automaton.") This admonishment cuts both ways. Particularly, the knowledge and creativity of a person of ordinary skill in the present case would direct him or her away from the proposed combination. Specifically, while it is true that neither Openlander nor Murphy specifically defines "low profile", clearly one of ordinary skill in the art would be discouraged by reading Openlander's desire to make a low profile antenna from adding any height to the antenna, let alone adding $\frac{1}{4}$ to $\frac{1}{2}$ of a wavelength. Secondly, again taking into consideration that the person of ordinary skill in this art would know what kinds of wavelengths these antennas would be used to transceive e.g., about 100 MHz - 5GHz (or about 12 inches down to about 2.34 inches) and the types of environments in which patch antennas would be used, e.g., roof-mounted to automobiles, hand-held devices, no one of ordinary skill would deem a patch antenna with 0.59-3 inches spacing between the two ground planes to be "low profile".

Although the Examiner raises the issue that the claims of the present application do not define "low profile", this is completely irrelevant. The issue that is being addressed is whether it would have been obvious to a person of ordinary skill in the art having Openlander and Murphy available to him or her to combine their respective features. In such analysis, the claims of the present application

are irrelevant. The obviousness inquiry must be conducted as if the specification and claims of the present application did not exist.

The simple facts are that Openlander desires a low profile antenna and Murphy clearly states that any practical embodiment of his antenna would have at least a $\frac{1}{4}$ wavelength between the two ground planes. The only persons who would not instantly find these two requirements to be contrary to each other would be a person who does not appreciate the subtleties of antenna design that are not expressly laid out in the references (such as typical RF frequencies, the environments in which such antennas are employed, the practical size and cost limitations for such antennas), i.e., a person who was NOT of ordinary skill in the art.

Hence, it would not have been within the skill of the person of ordinary skill in the related art to make the proposed combination of features of Openlander and Murphy as suggested by the Examiner.

For the foregoing reasons, Applicant respectfully requests the Board to reverse the rejections of claims 1,3-5, 7, 8, 14, 15, 18, and 23-36.

Respectfully submitted,

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/Theodore Naccarella

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